

WHAT IS CLAIMED IS:

1. A chromatography column comprising a column having a stationary phase and a mobile phase, wherein said stationary phase comprises carbonaceous material having attached at least one organic group.

5 2. The chromatography column of claim 1, wherein said organic group comprises at least one aromatic group directly attached onto the carbonaceous material.

3. The chromatography column of claim 1, wherein said organic group comprises at least one alkyl group directly attached onto the carbonaceous material.

4. ³⁸ The chromatography column of claim 1, further comprising a substance
10 comprising chemical species to be separated in said column.

5. ³⁹ A separation device comprising a mobile phase and a stationary phase, wherein
said stationary phase comprises carbonaceous material having attached at least one organic
group.

6. ⁴⁰ A method for conducting separation of chemical species from a substance,
15 wherein said method comprises passing said substance through a system containing a mobile
phase and a stationary phase, wherein said stationary phase comprises carbonaceous material
having attached at least one organic group.

7. ⁴¹ The method of claim 6, wherein said separation is chromatography.

8. ⁴² The method of claim 6, wherein said separation is size exclusion
20 chromatography.

9. ⁴³ The method of claim 6, wherein said separation is chromatography by affinity
wherein the chemical species in the substance have different affinities for the stationary phase.

10. ⁴⁴ The method of claim 6, wherein said separation is an adsorption-desorption
chromatography.

25 11. The method of claim 6, wherein said separation is electrophoresis.

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21. The separation device of claim 5, wherein the organic group comprises polyethylene glycol or methoxy-terminated polyethylene glycol or derivatized resins thereof.

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5 22. The separation device of claim 5, wherein the organic group comprises $-\text{Ar}-((\text{C}_n\text{H}_{2n})\text{COOX})_m$, wherein Ar is an aromatic group, n is 0 to 20, m is 1 to 3, and X is H, a cation, or an organic group.

23. The separation device of claim 5, wherein the organic group comprises $\text{Ar}-((\text{C}_n\text{H}_{2n})\text{OH})_m$, wherein Ar is an aromatic group, n is 0 to 20, m is 1 to 3.

24. The separation device of claim 5, wherein the organic group comprises $-\text{Ar}-((\text{C}_n\text{H}_{2n})\text{NH}_2)_m$, wherein n is 0 to 20, m is 1 to 3, or its protonated form: $-\text{Ar}-((\text{C}_n\text{H}_{2n})\text{NH}_3\text{X})_m$, wherein X is an ion, and Ar is an aromatic group.

25. The separation device of claim 5, wherein the organic group comprises $-\text{Ar}-((\text{C}_n\text{H}_{2n})\text{CHNH}_3^+\text{COO}^-)_m$ and the reaction products thereof with molecules containing functional groups terminated in $-\text{NH}_2$, $-\text{OH}$, or $-\text{COOH}$, wherein Ar is an aromatic group and n is 0 to 20.

15 26. The separation device of claim 5, wherein the organic group comprises $-\text{Ar}-((\text{C}_n\text{H}_{2n})\text{CH}=\text{CH}_2)_m$, wherein n is 0 to 20, m is 1 to 3 or $-\text{Ar}-((\text{C}_n\text{H}_{2n})\text{SO}_2\text{CH}=\text{CH}_2)_m$, where n is 0 to 20 and m is 1 to 3.

27. The separation device of claim 5, wherein the organic group comprises at least one chiral ligand group.

20 28. The separation device of claim 16, further comprising a second organic group attached on the carbonaceous material.

29. The separation device of claim 17, further comprising a second organic group attached on the carbonaceous material.

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36. The separation device of claim 24, further comprising a second organic group attached on the carbonaceous material.

38. The separation device of claim 26, further comprising a second organic group attached on the carbonaceous material.

40. The separation device of claim 29, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.

41. The separation device of claim 30, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.

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47. The separation device of claim 36, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.

49. The separation device of claim 38, wherein said second organic group has a shorter chain length or less steric hindrance than said organic group.